

Client: Mr. LuVerne E.W. Hogg  
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6459 Mack Road  
Peachland, BC V0H 1X8

Date: March 20, 2020  
TEC Services Project No: TEC 20-1592  
TEC Laboratory No: 20-098

REPORT OF NATURAL POZZOLAN TESTS			
Sample Date: <u>December 2019</u>		Date Samples: <u>December 2019</u>	
Manufacturer: <u>ZMM Canada Minerals Corp.</u>		Date Received: <u>January 15, 2020</u>	
Chemical Analysis	Results (wt%)	Specification (Class N)	
		ASTM C618-19	AASHTO M295-19
Silicon Dioxide (SiO <sub>2</sub> )	52.4	----	----
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> )	14.5	---	----
Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> )	8.79	----	----
Sum of Silicon Dioxide, Iron Oxide & Aluminum Oxide (SiO <sub>2</sub> +Al <sub>2</sub> O <sub>3</sub> +Fe <sub>2</sub> O <sub>3</sub> )	75.6	70.0 % min.	7.0 % min.
Calcium Oxide (CaO)	6.2	----	----
Magnesium Oxide (MgO)	5.1	----	----
Sodium Oxide (Na <sub>2</sub> O)	3.26	----	----
Potassium Oxide (K <sub>2</sub> O)	3.33	---	----
“Sodium Oxide Equivalent (Na <sub>2</sub> O+0.658K <sub>2</sub> O)”	5.45	----	----
Sulfur Trioxide (SO <sub>3</sub> )	0.02	4.0 % max.	5.0 % max.
Loss on Ignition	3.9	10.0 % max.	5.0 % max.
Moisture Content	2.61	3.0 % max.	3.0 % max.
Available Alkalies			
Sodium Oxide (Na <sub>2</sub> O) as Available Alkalies	2.21	----	----
Potassium Oxide (K <sub>2</sub> O) as Available Alkalies	2.45	----	----
Available Alkalies as “Sodium Oxide Equivalent (Na <sub>2</sub> O+0.658K <sub>2</sub> O)”	3.82	----	1.5 % max.
Physical Analysis			
Fineness (Amount Retained on #325 Sieve)	9.9%	34 % max.	34 % max.
Strength Activity Index (Lehigh Leeds Alabama Portland Cement)			
At 7 Days:		81%	75 % min. <sup>†</sup> (of control)
Control Average, psi: 4810	Test Average, psi: 3910		
At 28 Days:		84%	75 % min. <sup>†</sup> (of control)
Control Average, psi: 5850	Test Average, psi: 4910		
Water Requirements (Test H <sub>2</sub> O/Control H <sub>2</sub> O)		109%	115 % max. (of control)
Control, mls: 242	Test, mls: 263		
Autoclave Expansion	-0.03%	± 0.8 % max.	± 0.8 % max.
Specific Gravity:	2.54	----	----

<sup>†</sup> Meeting the 7 day or 28 day strength activity index will indicate specification compliance.

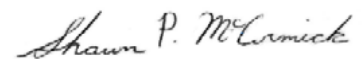
\* Optional

The results of our testing indicate that this sample complies with ASTM C618-19 and AASHTO M295-19 specifications for Class N pozzolans.

Respectfully Submitted,  
SGS TEC Services



Dean Roosa  
Project Manager



Shawn McCormick  
Laboratory Principal